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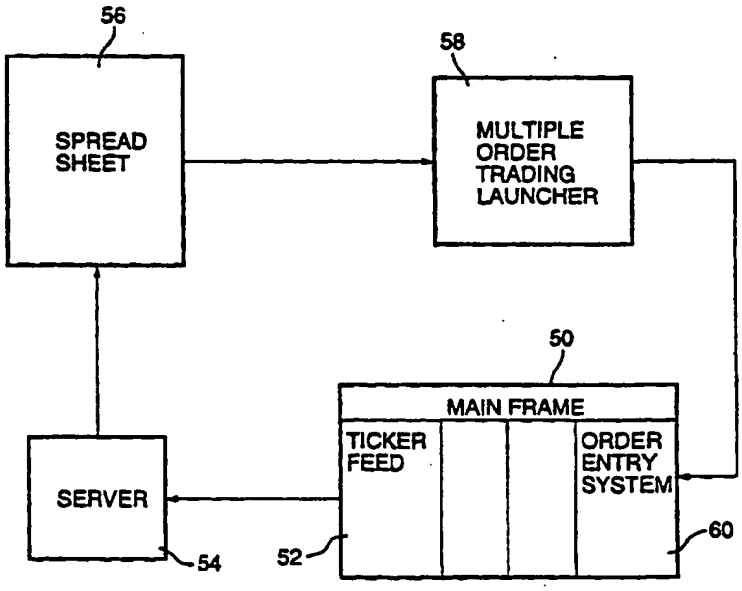

(57) Abstract

An improvement in computer automated stock exchange trading whereby a graphic user interface with a mouse and display is used to select parameters such as share symbol, price selection, order size, and transaction type, as well as other indicators to launch a trading order to the order entry system of a stock exchange computer. Further improvements include a programmed interface by which data on a group of shares may be read from a spreadsheet formulated into an order and launched automatically or in response to a signal from an operator so as to trade an index or basket of shares substantially instantaneously.

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COMPUTERIZED STOCK EXCHANGE TRADING SYSTEM

This invention relates to automated means for effecting the purchase and sale of shares traded on a stock exchange. More particularly, it relates to computer software and hardware by which an operator may instantaneously effect the transfer of shares of a large number of corporations.

BACKGROUND:

For many years the trading of shares listed on a stock exchange were effected by the activities of people known as traders on the trading floor of a stock exchange, and were confirmed by some form of notation or writing on paper. Once effected, the trades or transfers of shares were formally reported to brokers for the purchasing and selling customers in a formal way with or without the delivery of the share certificates.

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More recently the transactions have become automated so that trades may be done by a trader operating a keyboard to enter the necessary commands into a terminal connected to the mainframe computer of the stock exchange, or a small personal computer with a terminal emulator. With this automated system a trader may enter an order to buy or sell which is transmitted to the central system of the stock exchange where it matched with another trader who is willing to sell or buy the same shares, and the computer then confirms the completion of the transaction to each trader, and the transaction is confirmed and recorded by means of a hard copy generated on a printer.

Although this computerized automated system was much faster than the trading floor, it still required a trader to key in by hand the necessary data and commands for each

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individual stock being traded. From the information available at a terminal, the trader/operator would have to input the symbol for the company shares, the price, the exchange, the size of the order, and the instructions to buy, sell, cross or short trade the stock.

It has even become possible to effect trades in certain stocks automatically when they reach a certain price level.

However, modern investment strategies involve the investment in large groups or "basket" of listed shares as part of an entire portfolio which is strategically selected to provide a balance of growth potential, income generation, and risk avoidance. These portfolios are often held by mutual funds, banks, insurance companies, or other institutional investors, and they are frequently being changed to adjust the balance in the factors which effect growth, income and risks.

Some institutions invest in an established mixture of stocks which reflect the current economic climate in the country, such as the TSE 35, the TSE 100, the TSE 300, and in the United States the Dow Jones or other representative portfolios. In some cases institutional investors will establish their own collection of shares which it considers to represent their investment strategy and objectives. These may be weighted in favour of industry groups such as mining companies, financial institutions, manufacturing, or others considered preferable by the investment manager.

As a result of this strategy of investing in a mixed "basket" of shares, institutional investors are often increasing or decreasing their investment in the entire range of shares in a basket or index. This therefore requires a large number of trades in order to effect the single

investment move. Hitherto, this has been done by a trader/operator keying in the necessary trades in each individual stock through a computer terminal. Where the portfolio includes a list of 100 stocks, for example, this is a lengthy process and in fact the problem arises that the prices of many shares would change during the time it takes to key in the various orders, and the original conditions necessary to satisfy the requirements of the particular trade may no longer be present.

SUMMARY OF THE INVENTION:

It is therefore the purpose of the present invention to provide an automated, computerized trading system in which multiple share order entries can be executed automatically within seconds by the trader/operator in activating a few entries on a keyboard. This method of

trading is accomplished by means of the present invention in which a list of stocks is continually monitored and their prices recorded on a "spreadsheet format" on a personal computer and displayed on a screen. When the composite price of the list of stocks conforms to certain predetermined parameters, the trader can execute the necessary instructions to transform the list into an order on the personal computer (which is connected to the computerized order entry system of the stock exchange, which may be a mainframe), and the order will be immediately processed by the computer and sent to the exchange's order entry system. Thus, the purchase or sale of a basket comprising various numbers (volumes) of a variety of shares can be executed in a matter of seconds before the price or other conditions have changed.

By means of the system programmed in accordance with the present invention, a conventional terminal or personal computer capable of communication with a stock exchange central computer can be adapted to read, process, and react to information from the stock exchange, and/or commands of the operator and automatically and quickly perform multiple trades in a manner described above.

DESCRIPTION OF THE PREFERRED EMBODIMENT:

The invention may be better understood by a description of one embodiment with reference to the attached drawings in which:

Figure 1 is a schematic illustration of a mainframe stock exchange computer to which a series or terminals or personal computers are connected each comprising a display screen and keyboard;

Figure 2 is a graphic user interface suitable for use in executing single stock transactions;

Figure 3 is a graphic user interface used in effecting multiple trades in a basket comprising various volumes of a list of shares;

Figure 4 is a schematic block diagram which illustrates the sequence and flow of data and commands by which the system is used.

In the system illustrated in the attached drawings Figure 1 shows a mainframe computer 2 used to process all the data relating to the stocks listed on a stock exchange, such as the TSE, the VSE, or the NYSE, as the case may be.

Since the advent of computerized trading, these mainframe central computers are connected to a variety of terminals, such as 4, in various trading offices of brokerage houses through the city and abroad. By means of the individual terminals, traders may review data on the display screen 8 and input the necessary information and instructions on the keyboard 6 whereby a given volume of a particular stock is bought or sold (or crossed or shorted) in a manner which is the automated equivalent of an individual transaction on the trading floor.

Such a network is referred to, in the case of the Toronto Stock Exchange, as "CATS" which is an abbreviation for "Computer Aided Trading System", and similar systems are now commonly used and operated by many stock exchanges.

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Figure 2 illustrates an improvement which comprises a graphic user interface with a network such as CATS which allows a trader/operator to use the trading system more quickly and efficiently.

Whereas previously the data necessary for a transaction (stock symbol, volume, price, buy or sell, etc., etc.) had to be entered on the keyboard and showed up in the screen area 10 before the order could be launched to the central processing unit, the present invention allows the instructions to be put in much more quickly, more easily and with less error.

In the embodiment illustrated in Figure 2, the trader/operator can enter the symbol representing the stock in the area 12 followed by the price at which the transaction is to be completed in space 14 (which may be a selected price

or the bid offer or last price derived from the CATS data). Then the size of the order (or volume of the transaction) may be indicated in space 16 by selecting the appropriate nominal figures 1,000, 5,000, 10,000, 50,000 or by inserting the precise volume in the box 18. Many of the instruction choices provided by this interface (such as bid, offer, last, ID, volume, exchange, transaction) may be entered without keying by using a mouse as illustrated at 10 in Figure 1, which directs a cursor or indicator to the command.

In the illustrated embodiment the other information may be selected, such as the appropriate exchange in area 20, the type of transaction in area 22, the buy and sell IDs in areas 24 and 26. Other areas 28 provided by the interface include features to provide various information from the data bank as an aid to the operator.

To effect individual transactions an operator may, by mouse or a combination of mouse and keyboard, enter the necessary data and commands and quickly transmit the transaction to a stock exchange.

Thus, by means of the interface illustrated in Figure 2, transactions of a single stock through a computer aided trading system may be more quickly and efficiently executed.

The second aspect of the present invention is illustrated in Figure 3 which is a reproduction of a display screen which is part of the multiple stock trading system.

By means of the software of this invention, the terminal or personal computer illustrated in Figure 1 can be used to connect the spreadsheet of the system to the data base of the stock exchange mainframe and display the

information (including symbol, volume of shares, bid, first and last price) in the area 30 of the display screen of the terminal as shown in Figure 3. For purposes of trading an index or custom basket of shares, the display will contain the information with respect to the shares included in the index or basket as illustrated. The system then executes a dynamic data link to the spreadsheet which causes the spreadsheet to read the list of stocks to the multiple order trading system of the present invention. In the next step the system captures the spreadsheet data and makes each stock price and volume a variable that is inserted in a list of preprogrammed commands. The list is then sent to the order entry system of the stock exchange with a single key stroke.

Thus, each of the stocks and the pertinent data relating thereto is entered into the multiple order entry

system, and at the appropriate time and with the appropriate command, the entire basket can be dealt with in a single transaction within a matter of seconds before prices or other criterion change.

The present system therefore eliminates the need for a trader/operator to enter each individual stock and the transaction criterion, which in the case of 100 stocks or so, would be time-consuming, prone to error, and difficult to coordinate because of the changing prices and their relationship to the transaction criterion.

Also illustrated in Figure 3 is a box 32 in which the necessary commands may be entered from a keyboard.

Also illustrated, in area 34, is a series of commands which may be quickly entered by means of a mouse or similar device, including identification of the basket

of shares to be traded 36, the type of transaction (buy, sell, cross, or sell short) 38, the appropriate buy ID 40 or sell ID 42, and the price (bid, offer, or last) 44. When the appropriate commands have been entered the transaction may be executed by pressing the launch button 46 and all of the shares of the basket are traded almost instantaneously.

As in all cases a provision is made for the entry of a pass word 48 to provide security against unauthorized use and other functions which are commonly associated with graphic user interface are provided.

Therefore, by means of the present system, a terminal or personal computer may be used to capture from a spreadsheet all the data necessary to trade in a selected list or group of shares, and by inserting this data into the preprogrammed commands of the system, all of the necessary commands to execute the trade in all of the shares may be sent to the stock exchange order entry system in a single set of signals.

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It will be appreciated that this system will enable a trader to deal in baskets of shares, whether they are related to a standard index, such as the TSE 35 or the TSE 100, or a customized basket of shares designed for or by each customer and will be able to effect transactions quickly and without the complications that arise from the time delay in entering each stock transaction separately.

Figure 4 is a block diagram and flow chart which illustrates schematically how the present invention facilitates a faster more efficient operation of the automated trading facilities. In the diagram the mainframe or central computer of the stock exchange is shown at 50 and includes a ticker feed system 52 which constantly generates updated data on the prices and volumes of various stocks being traded, and delivers the updated data to a server 54 where the data

is stored and accessible to any terminals which are connected to the network. The information in the server is read by the spreadsheet 56 of a terminal, such as the one illustrated in Figure 1, which is designed to read and display a given basket of shares with the pertinent data with respect to volumes, bid, offer, last, etc. Block 58 represents the multiple order trading system of the present invention which reads the data from the spreadsheet, including all the data on a given basket of shares, organizes the data into the proper format for automated trading, and issues the multiple orders to the order entry system 60 of the central computer 50 at the stock exchange.

By having the data formatted by the multiple order launcher, the transaction of a whole basket of shares can be effected quickly, easily, with fewer errors and within the time frame for which the criterion or instructions for the transaction are valid.

By providing a means, such as the multiple order launcher, which is capable of capturing all the data on a spreadsheet, selecting what is required, and organizing it into the form of an order, the present invention creates a bridge between the spreadsheet, which contains the necessary data on a group of stocks, and the order entry system of the stock exchange which effects a transaction in those stocks.

Furthermore, because it can use and format the data more quickly and correctly than an operator on a keyboard, it is capable of effecting a transaction within the time and parameters which are rapidly changing, in a manner which an operator could not accomplished. Therefore, instead of merely processing data, it is capable of activating and controlling stock transactions. In this respect the

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system may be adapted to initiate a transaction automatically when certain criterion are met, or may be designed to create a signal when the criterion are met so that a trader/operator may make the final decision or judgment to execute the transaction or not, and may then execute it substantially instantaneously once the decision has been made.

Once the order entry has been received by the exchange system, the transaction is completed and the appropriate records and confirmation documents are produced in the usual manner without any further activity by the trader.

It will, of course, be realized that numerous modifications and variations from the illustrated embodiments may be employed without departing from the inventive concept herein.

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CLAIMS:

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. For use in a computer system having means to receive data from a central computer of a stock exchange on a spreadsheet; - display means and means to communicate orders to the order entry system of the stock exchange computer;

- a control system comprising means to read selected groups of said data from said spreadsheet;

- means to formulate said data in a manner acceptable to the stock exchange computer or entry system;

- means to launch said orders to the stock exchange computer order entry system.

2. A control system as claimed in claim 1 wherein said means to launch is responsive to conditions in the data read from said spreadsheet.

3. Apparatus as claimed in claim 2 wherein said means to launch said order is responsive to the commands of an operator.

4. Apparatus as claimed in claims 1, 2 and 3 wherein said means to read, means to formulate, and means to launch are operated by means of a graphic user interface with display means and a mouse adapted to communicate to selected controls on the graphic user interface display.

5. A system as claimed in claim 4 in which said graphic user interface displays commands which include share symbols, price selections, order size, and transaction type.

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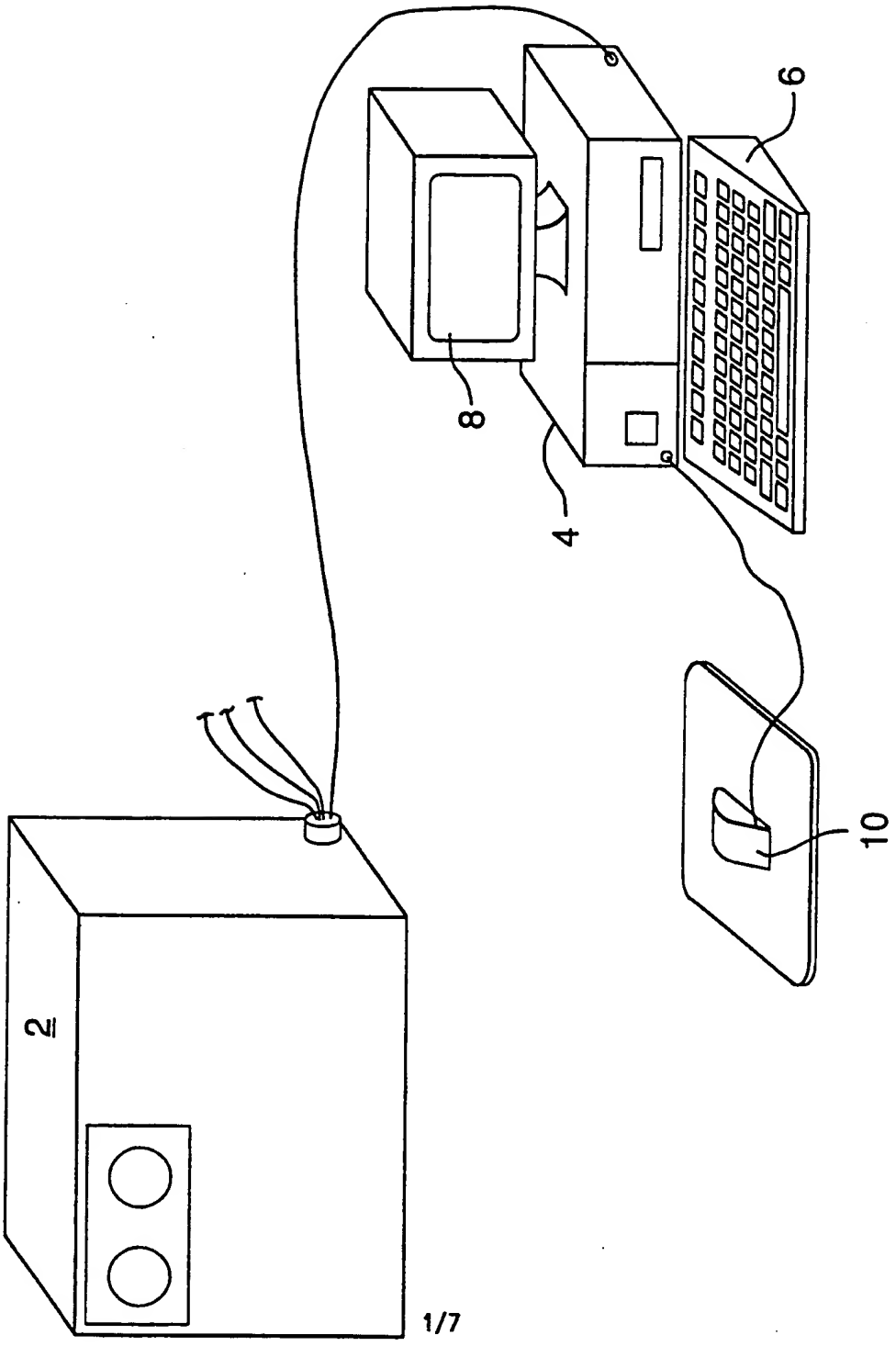

FIG.1.

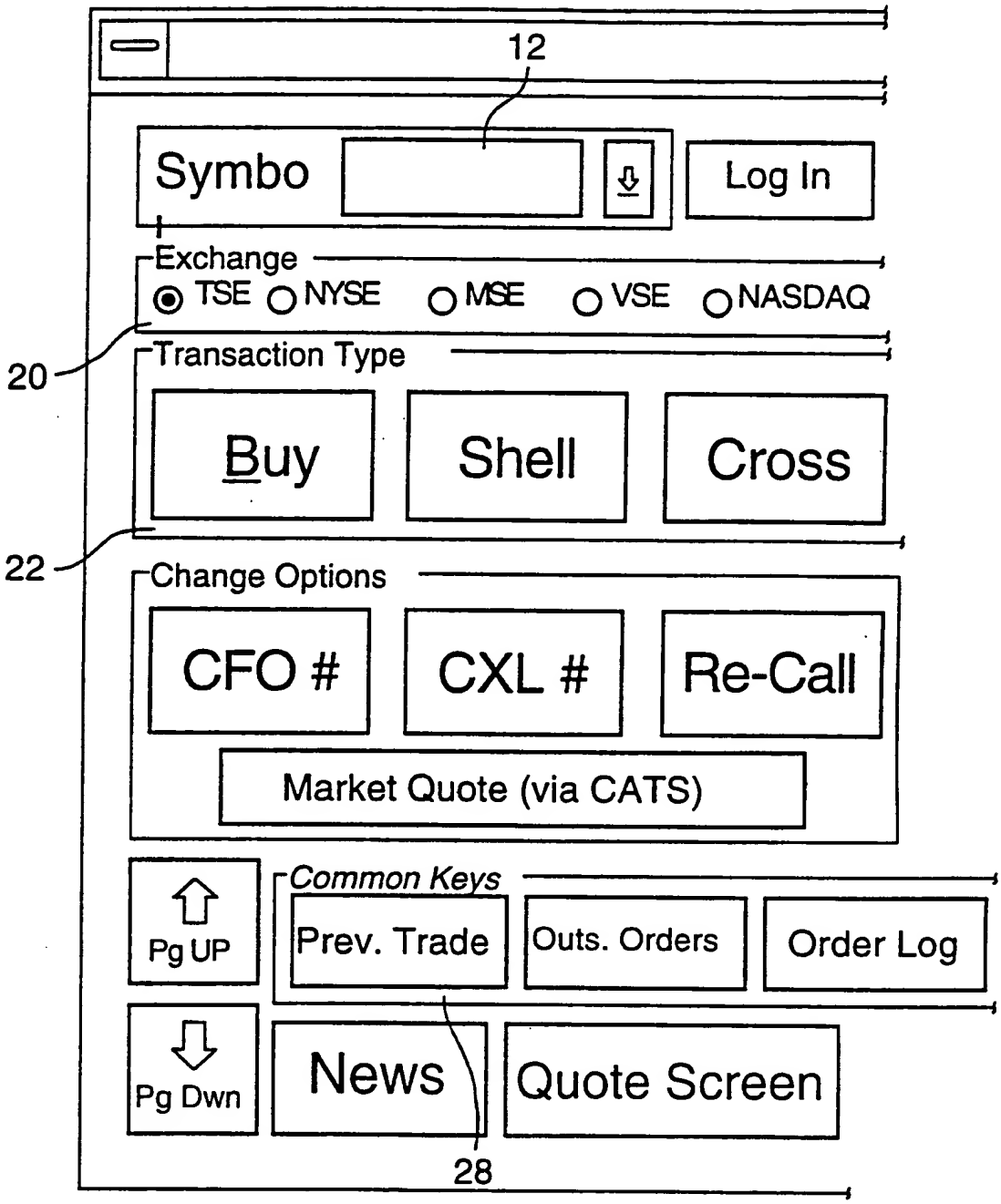

FIG.2A.

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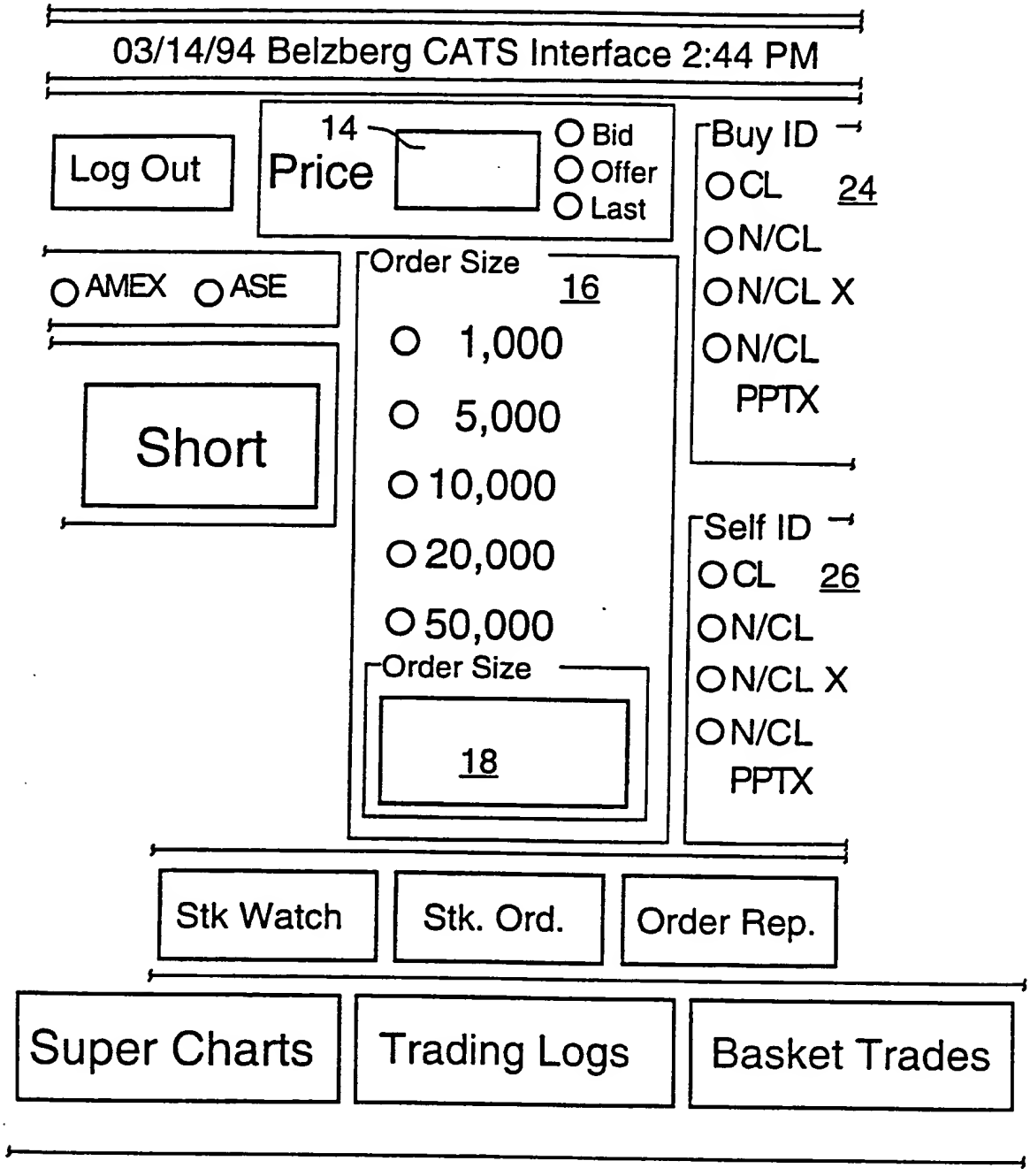
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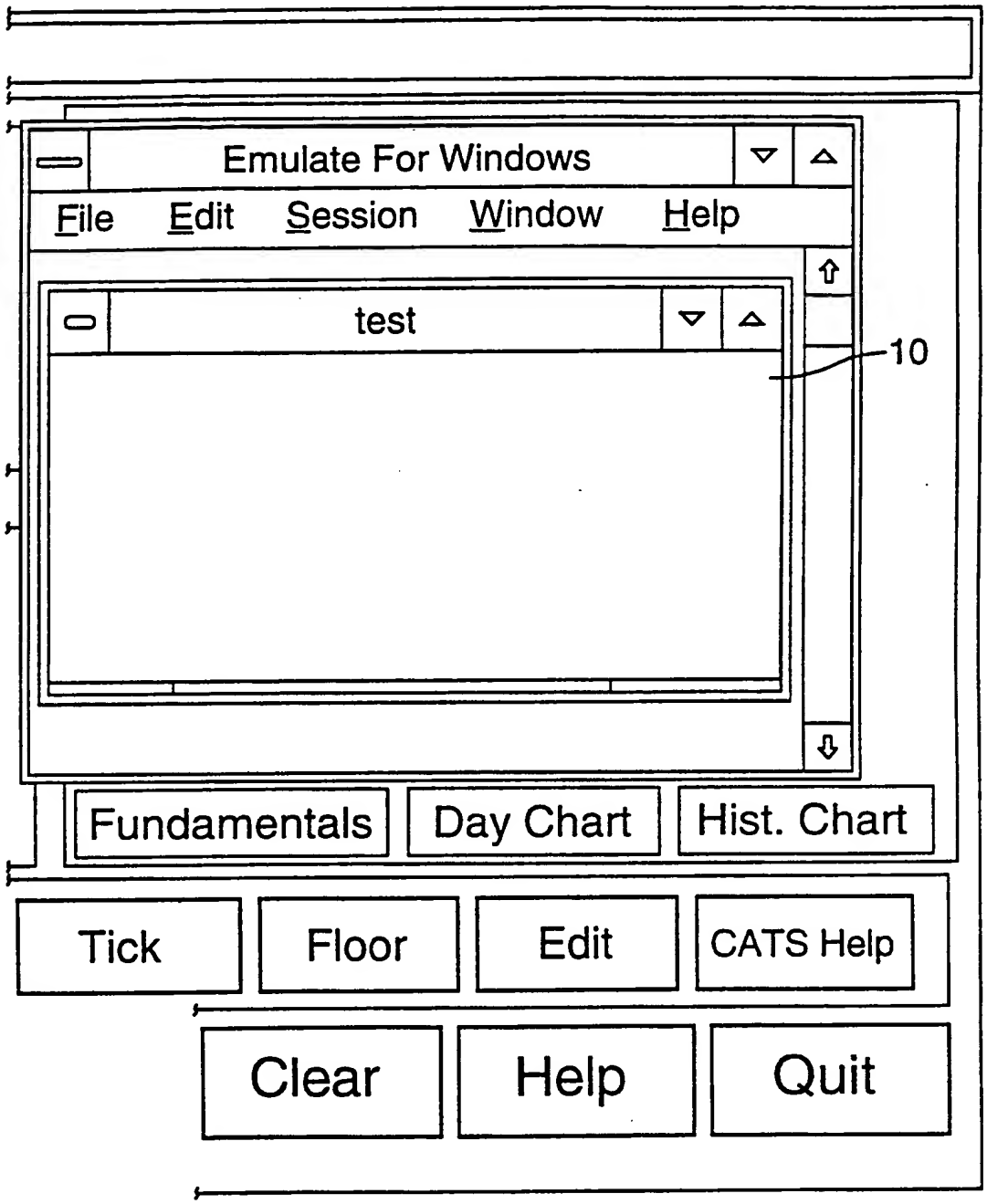
Basket Trades

FIG.2B.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Hist. Chart
Tick
Floor
Edit
CATS Help
Clear
Help
Quit

FIG.2C.

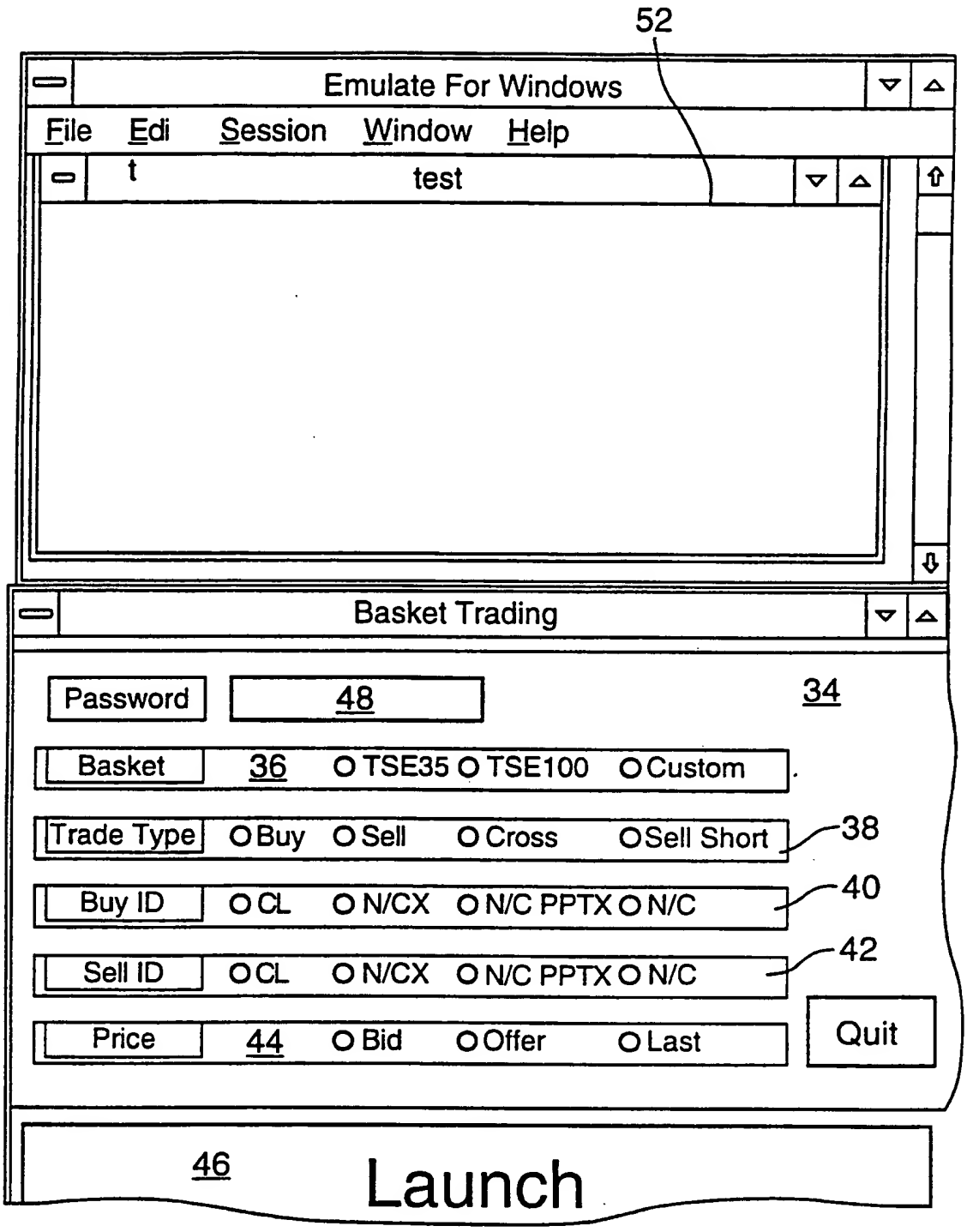

FIG.3A.

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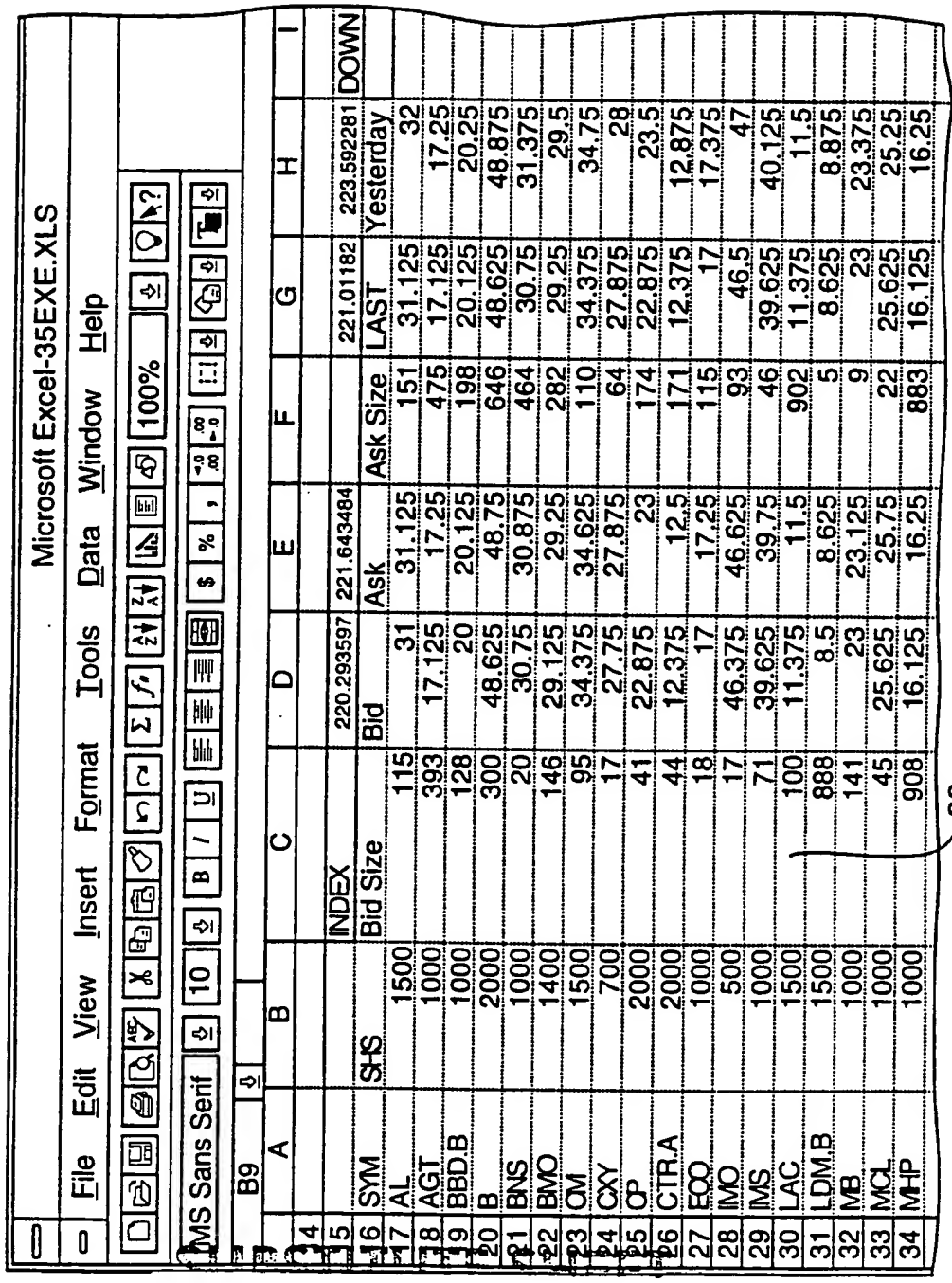

FIG.3B.

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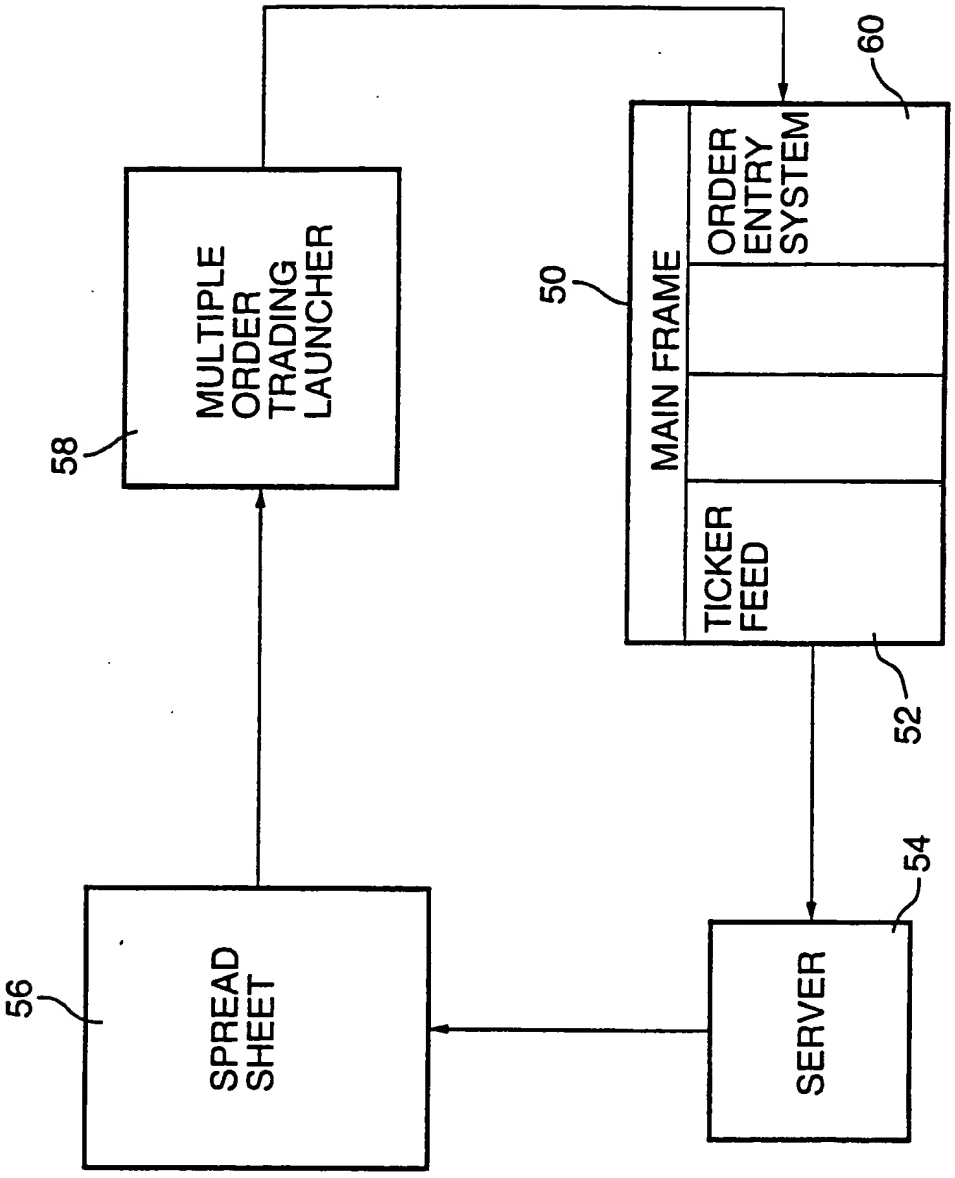

FIG.4.

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/CA 95/00123

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 401 203 (MJT HOLDINGS INC) 5 December 1990 see the whole document ---	1-5
X	EP,A,0 453 150 (COMMODITY EXCHANGE INC) 23 October 1991 see the whole document ---	1-5
X	WO,A,91 14231 (CHICAGO TRADE BOARD) 19 September 1991 see the whole document -----	1-5

☐ Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
21 July 1995	04. 08. 95

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	Suendermann, R

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter mal Application No
PCT/CA 95/00123

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